

Attorney's Docket No. 034423/237429

PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 09/921,323

Confirmation No.: 5051

Applicant(s): Gillespie et al

Filed: August 2, 2001

Art Unit: 1771

Examiner: John J. Guarriello

Title: SPUNBOND NONWOVEN FABRICS FROM RECLAIMED POLYMER
AND THE MANUFACTURE THEREOF

Customer No.: 00826

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF TRANSMITTAL
(PATENT APPLICATION – 37 C.F.R. § 41.37)

1. Transmitted herewith is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on October 19, 2005.
2. ☐ Applicant claims small entity status.
3. Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is:
☐ small entity \$250.00
☒ other than small entity \$500.00
☒ Any additional fee or refund may be charged to Deposit Account 16-0605.

Respectfully submitted,

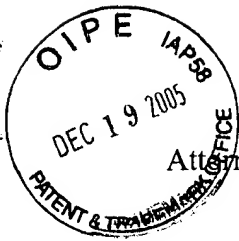
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 09/921,323 Confirmation No.: 5051
Applicant(s): Gillespie et al
Filed: 08/02/2001
Art Unit: 1771
Examiner: John J. Guarriello
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APPEAL BRIEF UNDER 37 CFR § 41.37

This Appeal Brief is filed pursuant to the "Notice of Appeal to the Board of Patent Appeals and Interferences" filed October 19, 2005.

1. ***Real Party in Interest.***

The real party in interest in this appeal is BBA Nonwovens Simpsonville, Inc., the assignee of the above-referenced patent application.

2. ***Related Appeals and Interferences.***

There are no related appeals and/or interferences involving this application or its subject matter.

3. ***Status of Claims.***

Claims 1 and 4-10 stand rejected in a Final Rejection dated July 22, 2005. Claims 11-28 have been withdrawn from consideration as being directed to non-elected claims.

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4. ***Status of Amendments.***

No amendments after final rejection were made.

5. ***Summary of Claimed Subject Matter.***

The present invention is directed to a process for producing a spunbond nonwoven fabric and is particularly concerned with providing the ability to utilize reclaimed polypropylene in the manufacturing process while maintaining the formation and product quality comparable to that which is obtained when using 100% virgin polymer.

As is pointed out in the Background of the Invention portion of Applicant's specification, pages 1 and 2, it is well known in the nonwovens industry to recycle polypropylene. However, the recycled polypropylene is not generally suitable for being used by itself in manufacture of spunbond nonwoven fabrics. Therefore, it is typically blended with virgin polypropylene. However, there is a limit to the amount recycled polypropylene that can be used. If too much recycled polypropylene is blended with the virgin resin, then an increase in the number of spinning breaks (broken filaments) will be seen. This causes quality defects in the finished spunbond nonwoven fabric or, in severe cases, a complete disruption of the manufacturing process. Additionally, too much recycled polypropylene can reduce the strength of the resulting nonwoven fabric. Applicant's specification goes on to note that for these reasons, the amount of polypropylene recycled back through the process has, in accordance with prior practices, been limited to less than about 20% of the total polypropylene by weight.

Applicant has discovered that by following a prescribed series of steps, as defined in the claims on appeal, it is possible to produce a spunbond nonwoven fabric at the high speeds which are necessary for practical and economical commercial production, and wherein the nonwoven fabric contains reclaimed polypropylene at high levels not previously attainable. In particular, the total amount of reclaimed polypropylene in the filaments is 25% or higher.

Referring to Figure 1, the process entails the steps of:

separately melting two or more polymeric components (in extruders 11, 12), at least one polymeric component including reclaimed polypropylene recovered from previously spun polypropylene fiber or webs comprised of previously spun polypropylene fiber;

separately directing the two or more molten polymer components through a distribution plate (24) configured so that the separate molten polymer components combine at a multiplicity of spinnerette orifices to form bicomponent filaments containing the two or more polymer components, the polymer components being arranged in a sheath-core cross-sectional configuration, with the polymer component containing reclaimed polypropylene being present in the core, and the reclaimed polypropylene being in an amount up to 100% by weight, and with the total amount of reclaimed polypropylene in the filaments being 25% by weight or greater;

extruding the multicomponent filaments from the spinnerette orifices into a quench chamber (30);

directing quench air from a first independently controllable blower (31) into the quench chamber and into contact with the filaments to cool and solidify the filaments;

directing the filaments and the quench air into and through a filament attenuator (32) and pneumatically attenuating and stretching the filaments;

directing the filaments from the attenuator (32) into and through a filament depositing unit (34);

depositing the filaments from the depositing unit (34) randomly upon a moving continuous air-permeable belt (40) to form a nonwoven web of substantially continuous filaments;

applying suction from a second independently controllable blower (42) beneath the air-permeable belt so as to draw air through the depositing unit (34) and through the air-permeable belt (40); and

directing the web through a bonder (44) and bonding the filaments to convert the web into a coherent nonwoven fabric.

6. *Grounds of Rejection to be Reviewed on Appeal.*

Claims 1 and 4-10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Taylor U.S. Patent No. 6,737,009 in view of Kent U.S. Patent No. 5,885,705. This is the sole ground of rejection on appeal.

The Examiner notes that Taylor is directed to a process and system for producing spunbond nonwoven fabrics formed of multicomponent filaments, and mentions that the filaments can be in a sheath core configuration. The Examiner recognizes, however, that Taylor does not teach the use of reclaimed polypropylene, and fails to teach that the core component of the bicomponent filament can be reclaimed polypropylene in an amount of up to 100% by weight.

The Kent reference is relied upon for its disclosure of bicomponent fibers having a contaminant-containing core and methods of making the same. The Kent reference is concerned with a carpet yarn containing bicomponent fibers having a polyamide sheath and a contaminant-containing polyamide core. The Examiner contends that it would have been obvious, in view of the Kent reference, to use a reclaimed polypropylene material as the core component in the Taylor process.

7. ***Argument.***

Applicant respectfully submits that the present invention would not have been *prima facie* obvious in light of the cited references.

As the standard for assessing obviousness, MPEP 706.02(j) lists the requirements for establishing a *prima facie* case of obviousness under 35 U.S.C. § 103:

First, there must be some suggestion or motivation, either in the prior art references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings to arrive at the claimed invention.

Second, there must be a reasonable expectation of success. The teaching or suggestion to make the combination of references and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

Finally, the prior art references must teach or suggest all of the claim limitations. It is respectfully submitted that these requirements have not been met and, therefore, a *prima facie* case of obviousness has not been established.

The Prior Art Does Not Teach All of the Claimed Limitations

As recognized by the Examiner, the Taylor reference does not teach or suggest using reclaimed polypropylene in a process for producing spunbond nonwoven fabric. Moreover, neither Taylor, nor any of the other the prior art of record, teaches or suggests this concept which is at the center of applicant's invention.

The Kent reference is not at all concerned with producing a spunbond nonwoven fabric. Rather, Kent is directed to an entirely different technology -- producing carpet yarn. The production of carpet yarn and the manufacture of a spunbond nonwoven fabric are similar only in that they both involve producing meltspun fibers. In the production of carpet yarn, a fiber-forming thermoplastic polymer, in this case nylon 6, is melted and extruded through a spinneret. The extruded fibers are quenched with air, treated with a lubricating oil finish, combined to form a yarn, and then wound up. The yarn is drawn and texturized to form bulked continuous fiber yarn suitable for tufting into carpets.

The Kent reference does not contain any teaching or suggestion with regard to reclaimed polypropylene. Nor does Kent contain any teaching with regard to bicomponent filaments of a spunbond nonwoven fabric. It certainly contains no teaching or suggestion of providing reclaimed polypropylene in the core of a sheath core filament of a spunbond nonwoven fabric.

Therefore, it is clear that neither Taylor nor Kent, nor any combination of these two patents, teach all of the limitations of the invention as claimed in independent claim 1, or in the other claims of record.

The subject matter of the claimed invention can only be arrived at from the Taylor and Kent references through a rather substantial extrapolation of the reference teachings. It is necessary to stretch or extend the Kent teachings, which as noted earlier are for a specific polymer (nylon 6) and for a specific technology (carpet yarn production), and to conclude that the teachings are of universal applicability and readily transferable to any virtually any polymer and to virtually any other kind of fiber spinning technology. There are untold numbers of different fiber-forming polymers, and there are also a large number of distinctly different fiber spinning technologies. The Examiner has put forth no cogent reasons why it is reasonable to

expect that the Kent teachings would be applicable to all polymers and to all fiber spinning technologies in general, or to polypropylene in a bicomponent spunbond process in particular.

There is no suggestion or motivation to modify the references

The process used by Kent for producing carpet yarn is fundamentally different from a spunbond nonwoven fabric process such as that described in the Taylor reference. Among the significant differences are the following:

- Kent produces carpet yarn, not a spunbond nonwoven fabric.
- The carpet yarn contains 58 filaments. (Kent example 1). The nonwoven fabric contains thousands of filaments, e.g. 3000-6000 per meter of width (Taylor Col. 3 lines 30-34).
- In the Kent carpet yarn process, filaments of molten polymer are extruded from spinnerets, and the freshly extruded filaments are quickly consolidated and brought together with one another a short distance downstream from the spinnerette to form a yarn. From this point on in the process, the filaments remain grouped together as a yarn. In the spunbond nonwoven process, by contrast, the filaments are never consolidated or grouped together. They are handled as individual filaments throughout the process.
- The carpet yarn is drawn and texturized, either in-line or in a subsequent operation, which develops molecular orientation and strength. Since the drawing and texturing is performed on the yarn, and not on individual filaments, if an individual filament were to break, it would be of little consequence. The broken filament would be entrapped in the yarn with other intact filaments.
- In a spunbond process such as that of Taylor, a spin beam extends across the width of the machine, e.g. 3 meters. Individual filaments are extruded through spinneret holes into a quench chamber, pneumatically drawn and attenuated, deposited onto a collection surface to form a web, and subsequently bonded, all in a continuous operation. All the while, the filaments remain separate from one another and are never combined into a yarn. In a spunbond process, filament breaks can have severe consequences. In the best case, a broken filament will produce a defect in the nonwoven fabric. In the worst case, the broken filament will wrap around one several rolls that come into contact with the

nonwoven fabric. This will necessitate shutting down the entire spunbond line so that an operator can manually remove the filament wrap from the roll. For these reasons, the breakage of filaments in a spunbond process presents major issues in fabric quality, operability and profitability. These same issues do not arise in a carpet yarn process and are unique to the spunbond process.

- Filaments of a carpet yarn are considerably larger than filaments in a spunbond nonwoven fabric. Kent states that carpet fibers are preferably from about 15-28 denier per filament. By contrast, the filaments of a spunbond nonwoven web are considerably finer, on the order of up to about 3 denier per filament. The finer filaments of a spunbond nonwoven fabric are thus more susceptible to breakage than the heavier filaments of a carpet yarn.
- The spinning speeds of a spunbond process are greater than those used in the manufacture of carpet yarn.
- Kent is dealing with a condensation polymer, a polyamide, namely nylon 6. The Taylor reference uses a polyolefin addition polymer, namely polypropylene.

Because of the fundamental differences between a spunbond process and a carpet yarn process, as outlined above, persons of skill in the art who are familiar with spunbond technology would not consider carpet yarn technology to be an analogous art. While it might be possible to incorporate significant quantities of contaminants in the core component of a bicomponent nylon 6 carpet yarn filament, as taught by Kent, persons of ordinary skill in the art of producing spunbond nonwoven fabrics, who are aware of the fundamental differences between the processes and the problems outlined above that are specific to the spunbond process, would not consider the Kent teachings to be translatable to the production of polypropylene filaments in a spunbond nonwoven process. There are simply too many differences in the processes and in the behavior of the different polymers. For these reasons, the person of ordinary skill in spunbond nonwovens technology would not consider the carpet yarn technology as being an analogous art.

Therefore, the proposed combination of the Taylor and Kent references lacks the necessary motivation required to establish a *prima facie* case of obviousness.

No Expectation of Success

As explained more fully above, the ordinarily skilled worker in producing spunbond nonwoven fabric, being aware of the specific problems encountered in a spunbond process, such as filament breakage for example, would have no reason to expect that reclaimed polypropylene could be incorporated into the core of the filaments of a spunbond nonwoven fabric. The fact that a contaminant-containing material may have been successfully incorporated into the core of a carpet yarn, as taught by Kent, says nothing about whether this could be successfully implemented in a spunbond process. The differences outlined above, and in particular the problems with filament breakage, are well known to persons of ordinary skill in the art of producing spunbond nonwoven fabrics. For this reason, the rejection also lacks the expectation of success which is required in establishing a *prima facie* case of obviousness.

The use of hindsight is improper

The Taylor and Kent references themselves contain no specific teachings that would incite someone to modify the Taylor process so that reclaimed polypropylene is present in the core of the filaments. Applicant has shown above that the person of ordinary skill in the art would not, either from the reference itself or from the knowledge generally available to one of ordinary skill, be motivated to make this modification, and moreover, this person of ordinary skill would have no reasonable expectation of success.

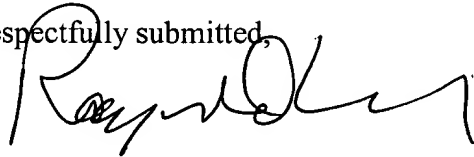
Assuming that there were some reasonable motivation for modifying the Taylor process in light of the Kent teachings, this modification should lead to placing Kent's contaminant containing nylon 6 polymer into the core of the Taylor bicomponent filaments. However, in order to arrive at applicant's claimed invention, it is necessary to take Kent's specific teaching with respect to nylon 6 and to apply it to an entirely different polymer – polypropylene.

From the foregoing, it should be evident that a hindsight reliance upon applicant's own disclosure is the only conceivable basis why one would combine the Taylor and Kent references in the manner set forth in the rejection. This is not a proper basis for an obviousness rejection.

Conclusion

Applicant has clearly shown that the requirements for establishing a *prime facie* case of obviousness under 35 U.S.C. §103 have not been met. Accordingly, the obviousness rejection should be reversed.

Respectfully submitted,

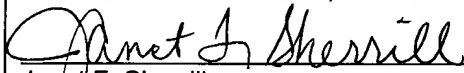


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Janet F. Sherrill

8. ***Claims Appendix.***

The claims currently on appeal are as follows:

1. A process for producing spunbond nonwoven fabric, comprising the steps of:
separately melting two or more polymeric components, at least one polymeric component including reclaimed polypropylene recovered from previously spun polypropylene fiber or webs comprised of previously spun polypropylene fiber;
separately directing the two or more molten polymer components through a distribution plate configured so that the separate molten polymer components combine at a multiplicity of spinnerette orifices to form bicomponent filaments containing the two or more polymer components, the polymer components being arranged in a sheath-core cross-sectional configuration, with the polymer component containing reclaimed polypropylene being present in the core, and the reclaimed polypropylene being in an amount up to 100% by weight, and with the total amount of reclaimed polypropylene in the filaments being 25% by weight or greater;
extruding the multicomponent filaments from the spinnerette orifices into a quench chamber;
directing quench air from a first independently controllable blower into the quench chamber and into contact with the filaments to cool and solidify the filaments;
directing the filaments and the quench air into and through a filament attenuator and pneumatically attenuating and stretching the filaments;
directing the filaments from the attenuator into and through a filament depositing unit;
depositing the filaments from the depositing unit randomly upon a moving continuous air-permeable belt to form a nonwoven web of substantially continuous filaments;
applying suction from a second independently controllable blower beneath the air-permeable belt so as to draw air through the depositing unit and through the air-permeable belt;
and
directing the web through a bonder and bonding the filaments to convert the web into a coherent nonwoven fabric.

4. The process according to Claim 1, wherein the polymeric component forming the core is formed entirely of said reclaimed polypropylene.

5. The process according to Claim 4, wherein the sheath is formed entirely of virgin polypropylene.

6. The process according to Claim 4, wherein the sheath is formed of a blend of virgin polypropylene and reclaimed polypropylene recovered from previously spun polypropylene fiber or webs comprised of previously spun polypropylene fiber.

7. A process for producing a spunbond nonwoven fabric, comprising the steps of:
separately melting a first polymeric component comprising virgin polypropylene and a second polymeric component comprising reclaimed polypropylene recovered from previously spun polypropylene fiber or webs comprised of previously spun polypropylene fiber;

separately directing the first and second molten polymer components through a distribution plate configured so that the separate molten polymer components combine at a multiplicity of spinnerette orifices to form bicomponent filaments containing a core of the second polymer component and a surrounding sheath of the first polymer component, with the core containing reclaimed polypropylene in an amount up to 100% by weight, and with the total amount of reclaimed polypropylene in the filaments being 25% or greater;

extruding the bicomponent filaments from the spinnerette orifices into a quench chamber;
directing quench air from a first independently controllable blower into the quench chamber and into contact with the filaments to cool and solidify the filaments;

directing the filaments and the quench air into and through a filament attenuator and pneumatically attenuating and stretching the filaments;

directing the filaments from the attenuator into and through a filament depositing unit;
depositing the filaments from the depositing unit randomly upon a moving continuous air-permeable belt to form a nonwoven web of substantially continuous filaments;

applying suction from a second independently controllable blower beneath the air-permeable belt so as to draw air through the depositing unit and through the air-permeable belt;
and

directing the web through a bonder and bonding the filaments to convert the web into a coherent nonwoven fabric.

8. A process according to Claim 7, wherein the second polymer component has a melt flow rate at least 5 units greater than that of the first polymer component.

9. A process according to Claim 7, wherein the core is formed entirely of said reclaimed polypropylene.

10. A process for producing a spunbond nonwoven fabric, comprising the steps of:
reclaiming polypropylene from previously spun polypropylene fiber or webs comprised of previously spun polypropylene fiber;

separately melting a first polymeric component comprising virgin polypropylene and a second polymeric component comprising the reclaimed polypropylene;

separately directing the first and second molten polymer components through a distribution system configured so that the separate molten polymer components combine at a multiplicity of spinnerette orifices to form bicomponent filaments containing a core of the second polymer component and a surrounding sheath of the first polymer component, with the core containing reclaimed polypropylene in an amount up to 100% by weight, and with the total amount of reclaimed polypropylene in the filaments being 25% by weight or greater;

extruding the bicomponent filaments from the spinnerette orifices into a quench chamber;
directing quench air into the quench chamber and into contact with the filaments to cool and solidify the filaments;

directing the filaments and the quench air into and through a filament attenuator and pneumatically attenuating and stretching the filaments;

directing the filaments from the attenuator into and through a filament depositing unit;

depositing the filaments from the depositing unit randomly upon a moving continuous air-permeable belt to form a nonwoven web of substantially continuous filaments; and

directing the web through a bonder and bonding the filaments to convert the web into a coherent nonwoven fabric.